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ACADEMIC ACHIEVEMENT AND JOB SATISFACTION: A STUDY OF HOLLAND'S THEORY OF CAREERS

by

© DONALD ANDREI MELNYCHUK

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(Signed) Don Melnychuk

PERMANENT ADDRESS:

11511 32A Avenue
Edmonton, Alberta
TJ6 3G6

DATED 17 September 1982

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled ACADEMIC ACHIEVEMENT AND JOB SATISFACTION: A STUDY OF HOLLAND'S THEORY OF CAREERS submitted by DONALD ANDREI MELNYCHUK in partial fulfilment of the requirements for the degree of DOCTOR OF PHILOSOPHY IN EDUCATIONAL PSYCHOLOGY.

G.W. Fitzsimmons
Supervisor

J.G. Paterson

J Mitchell

Pierre Turgeon
External Examiner

Date 17 September 1982

ABSTRACT

Holland's theory of careers (Holland, 1973) postulates that the secondary constructs of congruency, consistency and differentiation as measured by the Self-Directed Search (SDS) may be used to predict a person's educational achievement and occupational satisfaction. The purpose of this study was to examine the ability of Holland's secondary constructs to predict academic achievement and job satisfaction for high school students. To accomplish these two goals, the study was divided into two parts and was completed over a five-year period.

Groups of 165 male and 154 female Grade 11 students were administered the SDS in 1977 and were categorized in terms of congruency, consistency and differentiation. Their academic achievement was assessed by final grade averages in three Grade 10 subjects: English 10, Biology 10 and Typing 10. This group of 319 students formed the sample for the first part of the study which examined the relationship between academic achievement and Holland's constructs.

Five years later in 1982, two job satisfaction questionnaires which were the Job Descriptive Index (JDI) and the Minnesota Satisfaction Questionnaire (MSQ) were mailed to the original group of students. From the original group, 102 males and 98 females replied. This group of 200 subjects comprised the sample for the second part of the study which examined the relationship between job satisfaction and Holland's constructs measured five years earlier.

The results from the first part of the study indicated that there was no relationship between consistency and academic achievement. No differences were found between high and low subjects (male or female) for either English 10, Biology 10 or Typing 10 scores. It was also determined that there was no relationship between differentiation and academic achievement with the exception of the situation which occurred with Biology 10 where it was found that the high differentiated males had significantly higher scores than the low differentiated males. These results indicate no support for consistency and a low level of support for differentiation for the theoretical position that consistency or differentiation are related to academic achievement.

The results of the second part of the study indicated that Holland's constructs of congruency and differentiation are meaningful predictors of job satisfaction over a five-year period. No support was found for the ability of the construct of consistency to predict job satisfaction. No support was found to substantiate the hypothesis that congruency, consistency and differentiation combine meaningfully to account for satisfaction as measured by the JDI or MSQ.

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CHAPTER I

INTRODUCTION

Need for the Study

Holland's theory of careers (Holland, 1972) has been gaining popularity over the past ten years with high school counsellors. Since knowledge of Holland's typology is necessary for interpretation of the Strong-Campbell Interest Inventory (SCII; Campbell, 1974), the Self-Directed Search (SDS; Holland, 1977), the Vocational Preference Inventory (VPI; Holland, 1975), and the Career Assessment Inventory (CAI; Johansson, 1976), an understanding of the six personality types and the secondary constructs of congruency, consistency and differentiation has become essential to counsellors.

While much research has been done on Holland's theory, there is still a further need for research on the usefulness of Holland's secondary constructs of congruency, consistency and differentiation and their relationship to educational and occupational achievement, satisfaction and stability (Holland, 1976; Walsh, 1973; O'Neil, Magoon & Tracey, 1978; Holland, Magoon & Spokane, 1981). O'Neil (1977) has stated that initial research assessing the two theoretical constructs of consistency and differentiation needs to be replicated on larger samples using all the personality types and using different measures of aptitude and achievement. Holland, Gottfredson and Nafziger (1975) advocate that the constructs of congruency, consistency and differentiation be validated against more concrete criteria like achievement, stability or other career development indices.

The majority of the research done on Holland's secondary constructs has been undertaken with adult and college populations. There appears to be a need for further validity studies with high school students. This need is pointed out in a study by Borolas (1976) which attempted to apply Holland's constructs to a group of high school seniors. The researcher recommended that more research with high school students be done with Holland's constructs of congruency, consistency and differentiation. It was also recommended that longitudinal studies on the developmental nature of the constructs be done. The literature to this date reveals that no longitudinal studies concerning the relationship between Holland's secondary constructs and job satisfaction have been done with high school students.

Purpose of the Study

Two important goals of the high school counsellor are to help high school students maximize their academic potential and to help make them aware of occupations which might be satisfying to them. Holland's constructs of congruency, consistency and differentiation are diagnostic tools which can assist the counsellor in achieving these two goals. This study was conducted to examine the ability of Holland's constructs in predicting academic achievement and job satisfaction with high school students. If these constructs can be validated with high school students, the high school counsellor will be able to apply them with more confidence. Specifically, it may be possible for the counsellor to determine which students may experience future academic problems and to assist students in finding satisfying occupations.

Statement of the Problem

The present study was designed to examine how Holland's constructs of consistency and differentiation relate to educational achievement and to examine how the constructs of congruency, consistency and differentiation relate to job satisfaction over a five-year period. The study was designed to answer the following basic questions:

1. Does a high consistent student experience more academic success than a low consistent student?
2. Does a high differentiated student experience more academic success than a low differentiated student?
3. Does a high congruent worker express greater job satisfaction with his current job than a low congruent worker?
4. Does a high consistent worker express greater job satisfaction with his current job than a low consistent worker?
5. Does a high differentiated worker express greater job satisfaction with his current job than a low differentiated worker?
6. Does a high congruent, high consistent and high differentiated worker express greater job satisfaction than a low congruent, low consistent and low differentiated worker?

Theoretical Background

Holland proposed a theory of career development based on an interaction between personality and environment. The theory was proposed in 1959 and revised in 1966 and 1973. The latest revision, Making Vocational Choices: A Theory of Careers, summarizes more than one hundred studies which deal with this theory. Over ninety studies lend some support to the theory's typology and classification scheme.

Holland's theory is based upon four main assumptions: first, people can be categorized in terms of six personality types; second, there are six kinds of model environments; third, people search for environments that they will find stimulating and satisfying; and last, a person's behavior is determined by an interaction between his personality and the characteristics of his environment.

According to Holland, the environment is an extension of the predominant classification of individuals within the environment. The premise for classification is that people will seek environments that are compatible with their personality type and avoid those that are incompatible.

Holland's four main assumptions are supplemented by three secondary constructs. The first construct, congruency, is used to assess the degree of compatibility between personality types and environments. The second and third constructs, consistency and differentiation, are used to further refine the measurement of individual personality patterns or model environments. In this section, detailed descriptions of the basic components of Holland's theory (personality types, model environments, hexagonal model, congruency, consistency and differentiation) are presented.

Personality types. Holland hypothesizes that most people can be categorized into one of six personality types. Each of these personality types is the result of a characteristic developmental interaction between numerous personal and social influences such as parents, peers, social class and environment. In the period of development, a person comes to learn and prefer certain activities over others. The interest in a specific class of activities results in an accompanying group of competencies. The specific competencies which develop create a particular personal disposition or type which influences the nature of thought, perception and interpersonal reactions. Each person's types may be ranked according to their strength in a hierarchy. Obviously, a classification system of only six types is limited in attempting to deal with the wide diversity of human personalities. Thus, Holland has expanded his classification to deal with combinations of the types, using terms such as Artistic-Social or Enterprising-Social-Realistic, depending upon the relative strength of each theme in a given individual. Theoretically, if one were to use all possible combinations of the six themes, there would be seven hundred and twenty possible classifications. The typical characteristics, behaviors and preferred occupations for each of the six personality types are summarized in the following paragraphs (Holland, 1973).

The Realistic personality type is masculine, conforming, persistent, practical, asocial, aggressive and materialistic; has good motor coordination and has acquired some manual skills; prefers activities that involve the manipulation of tools or machines; values concrete things or tangible personal characteristics such as money, power and status; dislikes educational and therapeutic activities. Mechanics, farmers, fishermen, aviators, truck drivers, labourers and butchers resemble this type.

The Investigative personality type is analytical, independent, intellectual, introspective, introverted and unassuming; prefers activities that involve the observational and creative investigation of scientific phenomena; values science; dislikes social, persuasive and repetitive activities. Mathematicians, pharmacists, chemists, meteorologists and zoologists resemble this type.

The Artistic personality type is nonconforming, original, impulsive, intuitive and asocial; prefers activities that involve manipulation of physical, verbal or human materials to create art forms or products; values esthetic qualities; dislikes explicit, systematic and ordered activities. Photographers, writers, artists, dancers, sculptors and actors resemble this type.

The Social personality type is understanding, cooperative, persuasive, sociable and insightful; prefers activities that involve the manipulation of others to inform, train, develop, cure or enlighten; values social and ethical activities and problems; dislikes ordered or systematic activities involving materials or machinery. Teachers, ministers, nurses, bartenders and hair stylists resemble this type.

The Enterprising personality type is energetic, self-confident, domineering, ambitious and vociferous; prefers activities that involve the manipulation of others to attain organizational goals or economic gain; values political and economic achievement; dislikes observational and highly abstract activities. Managers, salespersons, business executives, lawyers and bankers resemble this type.

The Conventional personality type is efficient, practical, orderly, unimaginative and obedient; prefers activities that involve the explicit, systematic manipulation of data; values business and economic achievement; dislikes ambiguous and unsystematized activities. Secretaries, tellers, clerks, cashiers and bookkeepers resemble this type.

The validities of these descriptions have been researched in many studies and have been summarized by Holland (1979), Walsh (1973) and Reuterfors, Schneider and Overton (1979). Samples of college and high school students and adults have been classified by personality types using a variety of methods. These methods have included administration of the Self-Directed Search, Vocational Preference Inventory, Strong-Campbell Interest Inventory and Career Assessment Inventory and examination of vocational choice, vocational aspirations and choice of college major. In general, the research has supported the hypothesized characteristics of the personality types.

Model environments. Expanding on the ideas of Linton (1945), Holland believes that the dominant forces within an environment are transmitted via the people who inhabit it and depend largely on the typical characteristics of these people. Therefore, knowledge of the different types of people who dominate an environment may be used to analyze and predict the physical and social climate of the environment. Using these concepts, Holland proposed six model environments which correspond to each of the six personality types: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C). Helms (1975) describes Holland's six model environments as follows:

> A Realistic enviornment demands performance of technical, concrete, and physical tasks involving the use of tools and

machines to manipulate and modify objects and materials which require technical and mechanical competencies. It encourages people to see the world in simple, tangible and traditional ways and provides rewards for the display of conventional values and goals such as money, power, and possessions. Close interpersonal relationships and development of interpersonal skills are not reinforced.

An Investigative environment encourages the utilization of scientific and mathematical competencies and rewards achievements in these areas. The work involves dealing with abstract concepts and ideas as opposed to people. People are encouraged to perceive themselves as scholarly and to see the world in complex, abstract, independent, and original ways. Relationships with other people are primarily on a rational, analytic, and indirect basis.

The Artistic environment fosters free, ambiguous, and spontaneous activities and the use of creative competencies to produce art forms. People are encouraged to perceive themselves as expressive, nonconforming, intuitive, independent, and to see the world in complex, unconventional, and flexible ways. People tend to interact with others in personal, emotional, and expressive ways.

The Social environment provides opportunities for extensive inter-personal interactions with the objective of training, informing, helping, and communicating with others. Communication and human relation competencies in dealing with people are

> required. People are reinforced to see themselves as liking to help others, able to understand human behavior, cooperative, and sociable.
>
> The Enterprising environment encourages the manipulation of others to attain self-interest and organizational goals. Selling, leadership, and persuasive competencies are necessary skills. Values of money, power, and status are rewarded and people are encouraged to see themselves as aggressive, popular, sociable, and self-confident, and to view the world in stereotyped, constricted, dependent, and simple terms.
>
> The Conventional environment is typically structured and well-organized. Activities encouraged involve the manipulation and computation of numerical data, the organization and maintenance of records and files, and the operation of business and data processing machines and equipment. It fosters the development of computational, clerical, and organizational competencies. People are reinforced to perceive themselves as conforming, orderly, and nonartistic, and to view the world in conventional, stereotyped, constricted, and simple ways. Coping with others is generally implemented in a controlling, conforming, and practical manner. (pp. 8-9)

An environment can be classified by assessing the personality types within it. The type or pattern of an environment is a function of the percentage of people classified into a particular Holland category. For example, an occupation may have a distribution of people whose types are: 64% Conventional, 14% Enterprising, 10% Realistic, 6% Social, 4% Investigative, and 2% Artistic. The environment type or pattern would be CERSIA for this occupation. Other occupations, organizations or schools could be classified in the same manner.

Holland theorizes that, once a person's personality type is clearly dominant over the other types, the individual will seek an occupational environment which corresponds to this dominant orientation. To this end, he believes that work environments can be classified into the preceding six model environments.

Hexagonal model. The interrelationship among Holland's six categories can be represented by a hexagon (Figure 1) reported by Holland, Whitney, Cole and Richards (1969). The categories are placed at the vertices of the hexagon and arranged in the following clockwise order: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E) and Conventional (C). The relationship among types or the psychological resemblances among types are assumed to be inversely proportional to the distance among types shown in Figure 1. The shorter the distance between any two types, the greater their similarity or psychological resemblance (Holland, 1973). For example, Enterprising and Social are close together in Figure 1; therefore, they resemble one another. In contrast, Conventional and Artistic types are far apart; therefore, they are very different. Realistic and Enterprising types bear an intermediate degree of similarity. The hexagonal arrangement of the categories applies to both personality types and model environments.

The evidence for the hexagonal arrangement of vocational interests is substantial. Supporting studies include Cole's (1973) spatial

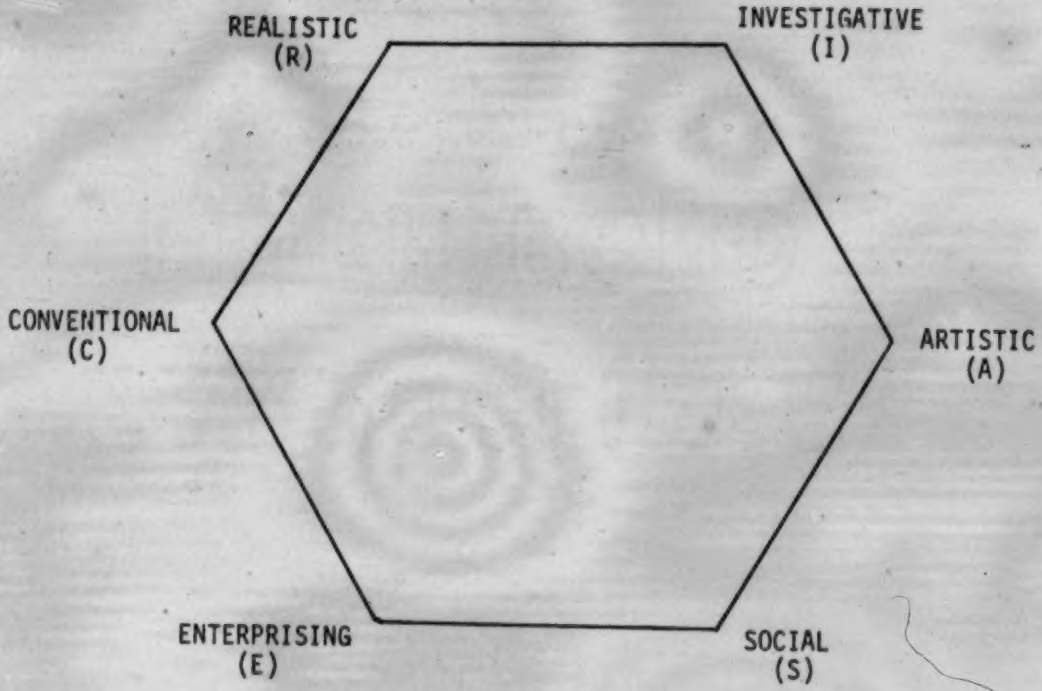
REALISTIC
(R)
INVESTIGATIVE
(I)
CONVENTIONAL
(C)
ARTISTIC
(A)
ENTERPRISING
(E)
SOCIAL
(S)

Figure 1

Hexagonal Model Representing Interrelationship Among Holland's Six Categories for Personality Types and Model Environments configuration analysis of the Strong Vocational Interest Blank, Vocational Preference Inventory and the Kuder Occupational Interest Survey. Crabtree and Hales (1974) reproduced the hexagonal arrangement using large samples of high school boys and girls. Sweet (1975) and Klein, Decker and Eckelman (1976) found more evidence supporting the hexagonal model. It also became apparent that the hexagonal model organizes the data in inventories based on the Roe and Holland classification (Meir & Beh-Yehuda, 1976).

The hexagonal model serves three purposes in Holland's Theory of Careers. First, it defines the degree of consistency in a person's personality pattern. Using a person's SDS profile, the two highest scale scores can be labelled as having one of three levels of consistency. Second, the hexagon defines the consistency of an environment in the same way. Third, the hexagon defines degrees of congruency between a person and his environment. For example, a most congruent situation would be a Conventional person placed in a Conventional environment; a most incongruent situation would be a Conventional person placed in an Artistic environment.

Congruency, consistency and differentiation. Holland uses the three secondary constructs (congruency, consistency and differentiation) to strengthen the predictive and descriptive value of his theory. Congruency is used to assess the degree of compatibility between the personality type and environment. Consistency and differentiation are used to explain the personality or environmental patterns.

The three constructs can be used to describe and explain educational and vocational behavior. Of interest to this study is the manner in which the constructs are used to explain occupational satisfaction and academic achievement.

Congruency is used to explain the compatibility between personality type and model environments. Holland (1973) states:

> Different types require different environments. For instance, realistic types flourish in realistic environments because such an environment provides the opportunities and rewards a realistic type needs. Incongruence occurs when a type lives in an environment that provides opportunities and rewards foreign to the person's preferences and abilities, for instance, a realistic type in a social environment. (p. 14)

The construct of congruency (Holland, 1973) suggests that the greater the similarity between individuals' personality types and the environmental types, the more educational and vocational achievement, stability and satisfaction they will achieve. Incongruent interactions result in a lack of achievement, instability and a lack of satisfaction. The degrees of congruency between a person and an occupational environment can be estimated by the hexagonal model. Depending on the operational definition of congruency, different levels can be obtained.

The construct of consistency is usually based upon the relative similarity between the primary and secondary profile codes. Two-letter profile codes for an individual or an environment can be classified according to their proximity on Holland's hexagon. In theoretical terms, consistent codes imply that the personality types most resembled are closely related, whereas inconsistent codes imply resemblance to divergent types. Holland (1973) postulates that individuals with high levels of consistency will demonstrate greater educational and vocational stability, achievement and satisfaction than individuals with low levels of consistency.

Three levels of consistency can be defined as a function of the distance on the hexagon between the two personality types that a person most resembles. If the two personality types are adjacent (RI, RC, IR, IA, AI, AS, SA, SE, ES, EC, CE, CR), the personality is highly consistent. If the two types are intermediate distances (RA, RE, IS, IC, AR, AE, SI, SC, EA, ER, CS, CI), the personality pattern is moderately consistent. If the two types are opposite one another on the hexgaon (RS, IE, AC, SR, EI, CA), the personality pattern would be inconsistent.

Differentiation implies that some persons or environments are more clearly defined than others and that a given person or environment most closely resembles one type. Differentiation is normally defined as the numerical difference between the highest and lowest profile scores on the Vocational Preference Inventory or the Self-Directed Search. The greater the absolute difference, the more differentiated is the personality pattern. Differentiation scores of individual profiles are considered to be high or low differentiated. Holland (1973) hypothesizes that individuals who have high differentiated profiles will demonstrate greater educational and vocational achievement, stability and satisfaction than individuals with low differentiated profiles.

Holland (1973) also theorizes that various combinations of the secondary constructs should intensify and make more predictable the hypotheses about occupational behavior. To take an example, a high congruent, high consistent and high differentiated person should be more satisfied at his job than a person categorized as low congruent, low consistent and low differentiated.

Definition of Terms

The following section provides the operational definitions of the variables used in this study.

Congruency. The three levels of congruency were defined by the relationships among the categories on the hexagonal model (Figure 1). The personality type of each subject was assessed by using the first three letters of a subject's summary code on the administration of the Self-Directed Search (SDS; Holland, 1977). Each subject's occupational environment was assessed by coding the subject's occupational choice in 1982. Each occupational choice was coded according to Holland's Occupations Finder. To assist in evaluating the degree of agreement between subjects' SDS codes and occupational choices, the Zener-Schnuelle index (Zener & Schnuelle, 1976) was used. This index is based on the inverse probability of occurrence of two three-letter codes taken two at a time. Table 1 summarizes the index which this study used.

Three levels of congruency were obtained by using the Zener-Schnuelle index.

a. Level 3, High Congruent. The degree of agreement between current occupational choice and SDS code was 6 or 5 on the Zener-Schnuelle index.

b. Level 2, Medium Congruent. The degree of agreement between

Table 1

Index of Agreement between Current Occupational Choice and SDS Code

Degree of Agreement		Current Choice		Summary Code
6	Are they exactly alike?	RIE	and	RIE
5	Are the first two letters in the same order?	RIA	and	RIS
4	The first three letters are the same, but are they out of order?	REI ERI RIE	and and and	IER REI EIR
3	Is the first letter in each code the same?	SIA	and	SER
2	Do the first two letters of one code match any two letters in the other?	RIC CES ASE	and and and	IER SCR ESI
1	Does the first letter of either code match any letter in the other code?	SEA	and	AIR
0	The first letter of one code is not included in the other code	IRE	and	SEA

current occupational choice and SDS code was 4 or 3 on the Zener-Schnuelle index.

c. Level 1, Low Congruent. The degree of agreement between current occupational choice and SDS code was 2, 1 or 0 on the Zener-Schnuelle index.

Consistency. Consistency was defined by comparing the first two letters of a subject's summary code which was obtained from the SDS. Two levels of consistency were operationally defined by the hexagon (Figure 1).

a. Level 1, High Consistent. If the first two letters were adjacent to each other on the hexagon (Figure 1), then the subject was considered as having a high consistent code. The high consistent codes were: RI, RC, IR, IA, AI, AS, SA, SE, ES, EC, CE AND CR (Holland, 1973).

b. Level 2, Low Consistent. Any other combination of first two letters was considered low consistent.

Differentiation. Differentiation was defined as the difference between a subject's highest and lowest summary score on the Self-Directed Search. Subjects were classified into high or low differentiation categories by dividing all scores at the group median. This involved calculating the median for the distribution of differentiation scores. The median was set at 27 for both male and female groups. Subjects falling on or above the median score were considered high differentiated and those below the score were considered low differentiated.

Personality type. A subject's personality type was defined by the first three letters of the Self-Directed Search summary code.

Environmental model. An environmental model will be operationally defined by the title of a subject's job as defined by the Occupations Finder (Holland, 1977), a classification of 456 common occupations using the six code letters (R, I, A, S, E, C) or the Holland Codes for C.C.D.O. (Government of Canada).

Job satisfaction. Job satisfaction is operationally defined by the Job Descriptive Index and the Minnesota Satisfaction Questionnaire Short-Form.

Organization of the Study

The study was completed over a five-year period. A group of 319 grade eleven students were administered the Self-Directed Search in 1977. Their academic achievement was assessed by final grade averages in Biology 10, English 10, and Typing 10. Five years later, in February, 1982, two job satisfaction questionnaires (the Job Descriptive Index and the Minnesota Satisfaction Questionnaire Short-Form) were mailed to the original group of students. The majority of the data (200 replies) was collected by April, 1982.

CHAPTER II

REVIEW OF THE LITERATURE

Chapter Two presents a review of the literature which deals directly with Holland's constructs of congruency, consistency and differentiation as measures of academic achievement and educational or job satisfaction. With only a few exceptions, the studies selected for inclusion were taken directly from Holland's theory of careers (Holland, 1966, 1973). Due to the large number of research studies concerned with Holland's secondary constructs, some studies were not included. It is hoped that the studies chosen will provide a representative and accurate picture of the research pertaining to the secondary constructs and their relationship to achievement and satisfaction. To provide a degree of organization, this chapter will be divided into three sections. The first section reports the findings of the studies concerned with the constructs of consistency and differentiation and their relationship to academic achievement. The second section reviews the findings of the studies concerning the constructs of congruency, consistency and differentiation and their relationship to educational satisfaction. The final section includes the findings of the studies examining the relationship of the three constructs and job satisfaction. A discussion of the literature and the null hypotheses are presented at the end of the chapter.

Student Populations and Academic Achievement

Posthuma and Navran (1970) examined the relationship between congruency of student-faculty interests and consistency of student-personality types to achievement at Royal Roads Military College. The Vocational Preference Inventory (VPI) was administered to 110 first-year students and to 44 faculty members who were in contact with the students during their first year. Students were divided into four groups based on final grades at the end of the year. It was found that the students who achieved high grades had interests congruent with those of the faculty. In addition, the students with lower grades had interests that were dissimilar to those of the faculty. It was also found that fifteen of the twenty-two faculty profiles had consistent codes. The passing ratio was much greater (7:1) for students with consistent codes than it was for students with inconsistent codes (2:1). This result supported the hypothesis that students with consistent codes would be predicted to do better academically than those with inconsistent codes.

Frantz and Walsh (1972) hypothesized that graduate students having consistent and differentiated personality patterns would be more satisfied and successful academically than students having inconsistent and undifferentiated personality patterns. The personality patterns were determined by administering the Vocational Preference Inventory to the 118 students. A questionnaire was used to measure the criterion measure of satisfaction and achievement was based on first semester final grades. It was found that differentiated students were significantly more satisfied and achieved more than the undifferentiated students. No significant results were found for consistency. Satisfaction and achievement appear to be independent of consistency in the analysis.

Foster and Gade (1973) studied the relationship between consistency and academic achievement. The sample consisted of 356 freshmen male college students. The Strong Vocational Interest Blank (SVIB) was administered to determine the level of consistency and the first semester grades were obtained to determine the subjects' achievement levels. Consistent and inconsistent vocational interest patterns were determined by locating the first and second highest SVIB patterns of scores and translating these into the appropriate category on Holland's (1966) schema. These categories were plotted on the "hexagonal model" developed by Holland, Whitney, Cole and Richards (1969). No significant results were found between levels of consistency and academic achievement.

O'Neil's (1977) study assessed the constructs of consistency and differentiation as measures of academic achievement. A sample of 127 male college students was administered the SDS in their freshman year. Academic achievement was assessed by the cumulative grade point average (GPA) over a four year college period. The subjects were categorized into three levels of consistency based on their SDS summary codes. Levels of consistency were determined by Holland's hexagonal model. Differentiation scores of the SDS scores were defined as the absolute difference between a person's highest and lowest SDS scores. Subjects were divided into high and low differentiation groups using a median split. The findings show no significant differences for GPA over a four-year college period for the signs of consistency and differentiation. The levels of differentiation do not show differentiated achievement in terms of GPA. All lists of the consistency hypothesis indicated that the levels of consistency do not predict achievement.

Another study which examined the relationship between Holland's two constructs and academic achievement was done by Reuterfors, Schneider and Overton (1979). The sample consisted of groups of 392 male and 424 female college freshmen. The Strong-Campbell Interest Inventory (SCII) was used to determine the level of consistency and differentiation for each student. Achievement was determined by each subject's Grade Point Average (GPA) at the end of the semester. Definitions of Holland's constructs relied upon assessments of the six personality types from the General Occupational Theme (GOT) scales which are derived from the SCII. Three levels of consistency were determined by choosing the two highest GOT scores and arranging them according to Holland's (1973) hexagonal arrangement of types. The degree of personality profile differentiation was defined as the numerical difference between the highest and lowest GOT scores for each subject. Each subject's differentiation score was classified into a high- or low-differentiation category depending on whether the score was above or below the median score of 20.69. The results of the study were very unclear for the two constructs. It was found that academic achievement decreased between the high and intermediate levels of consistency but increased significantly for the least consistent students. The V-shaped relationship between consistency and GPA appears contrary to Holland's hypothesized linear relationship. Separate analyses by sex showed that differentiated male students achieved significantly higher GPA's than undifferentiated males. No difference was observed between differentiated and nondifferentiated females.

Wiley and Magoon (1982) looked into the relationship between Holland's construct of consistency and academic achievement in college. This study was concerned only with college students who had a high Social type code. From the initial subject pool of 1,957 students, a total of 211 male and female subjects who had a high point Social summary code upon taking the Self-Directed Search were chosen. Subjects were classified in one of three levels of consistency. The sample consisted of 78 high (Social-Artistic and Social-Enterprising), 79 median (Social-Investigate and Social-Conventional) and 54 low (Social-Realistic) consistency types. Academic achievement was defined as the cumulative Grade Point Average (GPA) of the student at graduation. As predicted by Holland's theory (1973), consistency was related to mean GPA scores across the three levels of consistency for college students. It was found that high- and medium-consistency subjects had significantly higher GPAs than low-consistency subjects.

Defining consistency in different terms than the previous studies, Barak and Rabbi (1982) investigated the relationship between students' levels of consistency in choosing a major in college and their achievement. The researchers deviated from earlier studies on consistency in that they did not define consistency in terms of an interest inventory score from the SDS or SCII but by using students' actual college major choice alternatives. The subjects (293 male and female freshman students) were asked to rate their first and second choices of 43 college majors available on campus. Each of the 43 college majors were classified by 10 judges into one of the Holland environmental types. Depending on the first-letter code of each of the first two choices of college major, subjects were classified into one of four consistency levels. Student achievement was defined by the accumulative average of his/her courses that were taken until graduation. The results of the study suggest positive support for Holland's (1973) consistency hypothesis. It was clearly shown that a student's internal consistency in choosing a major in college is a good predictor of educational achievement over a period of 5 years. Students in the upper two levels of consistency had significantly higher grades than students in the lower two levels.

Student Populations and Educational Satisfaction

An early study that attempted to test the effectiveness of Holland's hypothesis concerning the relationship between congruency and expressed satisfaction was done by Morrow (1971). The major purpose of his study was to determine if Holland's theory of vocational choice could predict students' expressed satisfaction with their college major choices. Three hundred and twenty-three male and female college students majoring in mathematics and sociology were assigned personality classifications on the basis of their responses to the Vocational Preference Inventory. Students who were Investigative personality types majoring in mathematics and Social types majoring in sociology were considered congruent choices. Students with other personality types with those majors were considered incongruent choices. The congruency hypothesis was supported for the mathematics majors but not for the sociology majors. The mathematics majors with Investigative personality types exhibited a significantly higher degree of satisfaction than the other personality types. The personality types among the sociology majors did not differ in their degree of expressed satisfaction with their choice of major. In spite of some inconsistency between the mathematics and sociology majors, it was suggested that Holland's theory has sufficient validity in predicting satisfaction with choice of college majors to warrant further research.

Walsh and Lewis (1972) examined the relationship between congruency of college major choices and personality variables related to social-emotional maturity and intellectual activity. The Vocational Preference Inventory was used to measure personality types and the Omnibus Personality Inventory (Heist & Yonge, 1968) was used to measure the personality variables in the sample of seventy male and female college students. A congruent choice was defined as correspondence between planned or reported present college major and highest score on the personality types of the VPI. Non-correspondence was defined as an incongruent choice.

Significant differences between congruent and incongruent groups was found on the Personal Integrity, Anxiety Level and Impulse Expression scales. The congruent males, in contrast to the incongruent males, were more socially accepted, less anxious, in a state of well-being, logical and less impulsive. Incongruent males had feelings of loneliness, impulsivity and isolation. Support for the hypothesis that congruent person-environment interaction tends to result in greater satisfaction and better maintenance of personal stability was substantiated by the findings from the male group.

In a rather similar study two years later, Walsh (1974) studied the differences on personality variables between college students who made congruent and incongruent occupational choices. This time, he used the Self-Directed Search (SDS) instead of the Vocational Preference Inventory to define personality type and included the California Psychological Inventory (Gough, 1957) to the Omnibus Personality Inventory to define the personality variables.

The congruent male and female occupational groups were composed of students who reported a job choice consistent with their primary personality type determined by the first letter (highest score) of their SDS summary code. The incongruent male and female occupational choice groups were composed of students who reported a job choice inconsistent with their primary personality type. His sample consisted of 59 male and female college students. The findings suggest that congruent males tend to report being more socially accepted, confident and energetic than the incongruent male and female groups and to value intellectual achievement and work more than these groups. Congruent females were more self-regulated, practical, accepting and well-informed than the incongruent female group. The incongruent females were more retiring, insecure, lonely, unambitious and pessimistic in comparison to the congruent male and female groups. Even though a satisfaction questionnaire was not used, the results suggest indirectly that the congruent males and females tend to be more personally satisfied than the members of the incongruent groups.

Nafziger, Holland and Gottfredson (1975) expanded the work of Walsh (1974) by investigating the constructs of congruency, consistency and differentiation as they relate to different degrees of satisfaction with college majors. The sample consisted of 1,878 students from one college and one university. Before their freshman year, the students were given the Self-Directed Search followed by a satisfaction questionnaire developed by the authors. One or three years later using multiple analysis of variance, the results supported Holland's congruency hypothesis. Students whose types were most like the Holland codes of their majors indicated the most satisfaction, and students in majors with Holland codes that did not match their types indicated the least satisfaction. On the other hand, negative results were found for the hypothesized relationships between consistency and satisfaction and between differentiation and satisfaction.

Florence (1973) pursued the hypothesis that students who were congruent, consistent and differentiated in terms of the Vocational Preference Inventory (VPI) would achieve greater success in their vocational training programs and express greater satisfaction with their vocational choice. The sample consisted of 506 male students enrolled in sixteen different vocational-technical training programs. The VPI was used to measure Holland's constructs and the Student Satisfaction Questionnaire (SSQ; Brophy, 1959) was used to measure satisfaction with vocational choice. The results of the analysis revealed that students with VPI profiles which were congruent with their vocational choice achieved higher grade point averages than incongruent students. Similarly, students with consistent profiles had predictably higher grade point averages. No significant relationship existed between differentiated profiles and student grades. In addition, student satisfaction as expressed on the SSQ was not significantly related to the constructs of congruency, consistency or differentiation.

Spokane and Derby (1979) examined the relationship between congruency of expressed college major choice and variables related to satisfaction and certainty. One hundred and twenty-nine female undergraduates took the Barron's Ego Strength Scale (Levenson, 1972) and the Vocational Preference Inventory (VPI). A subject was classified as congruent on the basis of the correspondence between her Holland type and expressed major college choice. Holland type was operationally defined using the code from the VPI and the primary code from expressed college major choice as described by Holland (1966). Congruent students were found to be more certain and scored higher on perceived congruence than incongruent subjects. No significant relationship was found between congruence and satisfaction or between congruence and a personality pattern indicative of overall health and independence.

Using 121 male and 82 female freshman and sophomore college students, Walsh, Spokane and Mitchell (1976) explored the differences in academic adjustment variables between students who made congruent, incongruent and undecided college major choices. A congruent college major choice was one consistent with the student's primary personality type as defined by the VPI. An incongruent college major choice was one not consistent with the primary personality type of the student. For example, a student reporting a major choice (e.g. music) consistent with her peak score (e.g. Artistic) on the VPI was categorized as congruent. An incongruent college major choice (e.g. science) was one not consistent with the primary personality type (e.g. Social) of the student. The instruments used were the Vocational Preference Inventory (VPI) and the College Inventory of Academic Adjustment (Borow, 1949). The findings indicated that students who made a congruent choice seemed to be more adjusted (academically) than students who reported an incongruent choice. The congruent female and male students tended to report higher levels of aspiration and greater satisfaction with their college major choice than the other group. The congruent students seemed to be more satisfied with the college experience and more committed to the educational process.

Work Population and Job Satisfaction

Over the last 30 years a great deal of research concerning job satisfaction has been conducted, but relatively little is known about its determinants and consequences (Lawler, 1973). A large number of theories of job satisfaction have been developed: Fulfillment Theory (Schaffer, 1953; Vroom, 1964), Discrepancy Theory (Katzell, 1964; Locke, 1969), Equity Theory (Adams, 1963), and Two-Factor Theory (Herzberg, Mausner, Peterson & Capwell, 1957; Lawler, 1967). Still, very little of the research is guided by any theoretical framework (Locke, 1969). The preceding research on job satisfaction has typically been atheoretical and has not been tested for causal relationships. Due to the lack of a theory stating causal relationships, the research on job satisfaction has consistently looked simply for relationships among variables such as education, job level, age, absenteeism rate and productivity. A great deal is known about what factors are related to satisfaction but very little is known about the causal basis for the relationships.

The small number of studies that were conducted to examine the determinants of job satisfaction were primarily concerned with the relationship between satisfaction and job characteristics and the relationship between satisfaction and characteristics of the person. Lawler (1973) has noted, "Not suprisingly, the research shows that satisfaction is a function of both the person and the environment." A similar relationship is postulated by Holland (1966, 1973) who has presented a theory for categorizing persons and environments into explicit typologies (Mount & Muchinsky, 1978). The following studies include the results pertaining to Holland's theory and the relationship to job satisfaction.

One of the first studies that examined the relationship between Holland's constructs and job satisfaction using a group of employed adults was done by Bates, Parker and McCoy (1970). They studied the relationship between the constructs of congruency, consistency and differentiation and two work adjustment variables, job satisfaction and job achievement. The sample consisted of 200 male and female vocational clients with physical and psychological disabilities who had been rehabilitated and were subsequently employed. Each subject completed the Vocational Preference Inventory and the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England & Lofquist, 1967). The subjects' employers completed the Minnesota Satisfactoriness Scale (Lofquist & Dawis, 1969) as the measure of vocational achievement. The researchers found no significant relationship for congruency, consistency and differentiation with job satisfaction or achievement. The combination of congruency, consistency and differentiation was not found to be significantly related to either job satisfaction or achievement.

Gilbride (1973) investigated whether or not priests who have voluntarily resigned from the ministry could be differentiated from those who remained in terms of personality variables and person-environment interaction factors as expressed in Holland's (1966) theory of vocational choice. The sample consisted of 50 active and 50 resigned priests selected randomly. Each priest was administered the Vocational Preference Inventory and the Adjective Check List (ACL; Gough & Heilbrun, 1965). It was found that priests who voluntarily resign from the ministry cannot be differentiated from those who remain based on Holland's congruency and consistency hypotheses. Active and resigned priests had their highest profile peak on the Social scale and had the same two-digit high point, consistent personality combination: Social-Artistic. The biographical data revealed that 80% of the resigned priests presently work in social-model type occupations such as counselling or social work. This development may be viewed as an "interclass change" whereby the resigned priests have chosen an occupation which is in the same general class as their original choice. On the ACL profile, resigned priests scored significantly higher than active priests on self-confidence, achievement, endurance and order.

Lorch (1976) investigated the relationship of Holland's constructs of congruency, consistency and differentiation to job satisfaction. One hundred and seventy-one male and female employees of the marketing department of a large corporation participated in the study. The Vocational Preference Inventory was used to determine the subjects' personality types and three judges were selected to classify each subject's current job into one of Holland's six environmental types. Job satisfaction was measured by the Job Descriptive Index (JDI; Smith, Kendall & Hulin, 1969), the Minnesota Satisfaction Questionnaire and the General Motors Faces Scale (Kunin, 1955). The study demonstrated that employees rated to be highly congruent expressed greater amounts of job satisfaction than those employees judged to be low in congruency. Six of the eight measures of job satisfaction were sensitive to variations in levels of congruency. The results did not support the theoretical position that consistency is related to job satisfaction. No relationship was found between the differentiation and job satisfaction for male workers but on the JDI, a female employee high in differentiation expressed higher overall job satisfaction than a female low in differentiation. The three-way analysis of variance for the total group revealed partially supporting results combining the two constructs, congruency and consistency, to account for variations in job satisfaction. The three constructs did not combine meaningfully to account for job satisfaction. In this study, the JDI Total Score emerged as the most sensitive measure of job satisfaction.

Klein and Wiener (1977) examined the role of present job congruence as a moderator of the relationship between job tenure and job satisfaction and mental health. The sample consisted of 54 middle managers from a variety of managerial functions in several local companies. The division of the sample into high and low congruency groups was based on subjects' interest congruency scores. This score was the standard score from the Strong Vocational Interest Blank (SVIB) occupational scale judged to be most representative of the subject's present job. For each subject, two judges determined the SVIB occupational scale which best represented the employee's present job.

The Job Descriptive Index was used to measure satisfaction with the following job components: work, supervision, pay, promotions and co-workers. The researchers found that individuals who held jobs congruent with their interests enjoyed better mental health and higher job satisfaction as job tenure increased in comparison to individuals who held jobs incongruent with their interests. It was also determined that individuals who held jobs incongruent with their interests were expected to show increasingly poorer mental health and job dissatisfaction as their job tenure increased. Some tendency in this direction occurred. However, none of the negative correlations between job tenure and mental health and job satisfaction indices was significant. A possible explanation for this is that those individuals most sensitive to the stress and dissatisfaction produced by incongruence may tend to leave the incongruent job at a relatively early stage.

Mount and Muchinsky (1978) examined the relationship between the construct of congruency and job satisfaction for five of Holland's environmental typologies. A sample of 362 male and female employees from five environmental typologies (Realistic, Investigative, Social, Enterprising and Conventional) were classified as having congruent or incongruent person/environment pairing according to their occupation and their responses to Holland's Self-Directed Search. Job satisfaction was measured by the Job Descriptive Index (JDI). The results of the study indicate that overall job satisfaction (measured by the total score on the JDI) and satisfaction with work (as measured by the Work Scale of the JDI) are higher for congruent subjects than for incongruent subjects on four (Realistic, Investigative, Enterprising and Conventional) of the five typologies. While the results for the Social typology were not statistically significant, they were in the predicted direction.

Peiser and Meir (1978) studied the relationship between Holland's constructs of congruency, consistency and differentiation of vocational interests and vocational satisfaction. In the present study, Holland's constructs were applied to Roe's (1956) classification of occupations with eight fields rather than six. The researchers did not use the Vocational Preference Inventory or the Self-Directed Search but instead chose the Ramak interest inventory (Meir, 1978) to measure the subjects' interest profiles. The sample consisted of 158 males and 202 females. Congruence was operationally defined as existing if a subject was working in an occupational field (according to Roe's classification) in which he had his highest interest score on the Ramak. The judgement of one's occupational field was done by three vocational psychologists (Barak & Meir, 1974). The authors constructed their own one-item occupational satisfaction questionnaire. The results of the study supported the relevance of Holland's (1973) concepts of congruency, consistency and differentiation for Roe's (1956) occupational classification. Both congruent male and female groups had significantly higher occupation satisfaction scores than did the incongruent groups. It was found that when male vocational interests were congruent with occupational field, a positive relationship was found between consistency and differentiation on the one hand, and occupational satisfaction on the other. No significant relationship occurred for the female group. For the males, congruency, consistency and differentiation were found to have an accumulative contribution to occupational satisfaction.

Meir and Erez (1981) examined Holland's congruence hypothesis within the context of intraoccupational rather than interoccupational differences. By virtue of its internal diversity and the availability of a large population of students, engineering was the occupation chosen. One hundred and nine engineers were tested on an interest inventory which was designed to measure the vocational interest in six different job functions of the engineering occupation. The six designated job functions were: planning and designing, production, maintenance, management, control and inspection and training. The subjects were asked to determine which job function characterizes their present jobs. Job satisfaction was measured by the question: "To what extent are you satisfied in your present job?" Responses were rated on a 20-item scale ranging from 1 (dissatisfied) to 20 (satisfied). The results from the study confirmed Holland's congruence hypothesis. It was found that the higher the engineer's preference for the job function which dominates his present job, the higher his job satisfaction. The present study supports the notion that a proper match between one's vocational interests and actual job should be considered on the micro-level of intraoccupational differences in job requirements.

In another similar study which examined intraoccupational differences, Hener and Meir (1981) investigated the constructs of congruency, consistency and differentiation as predictors of job satisfaction within the nursing occupation. One hundred and thirty-six registered nurses were given the specially designed List of Courses in Nursing Inventory (LCN; Meir & Gate, 1981). The LCN is an interest inventory which measures the degree of interest in the nine clinical areas of nursing. The nine clinical areas were classified as: maternity, community, pediatric, mental health, chronic patients and geriatric, medical, surgical, emergency and intensive care and operating room. Job satisfaction was measured by the question: "To what extent are you satisfied in your present job?" Responses were rated on a 20-item scale ranging from 1 (dissatisfied) to 20 (satisfied). Congruency was defined as existing if the nurse worked in a clinical area which matched her preference. Consistency was defined as the similarity between the two most preferred clinical areas and differentiation was defined as the extent to which the nurse showed clearly defined interests on the LCN. It was found that there was a significant relationship between congruency and job satisfaction. The higher the congruency level, the higher the job satisfaction. The findings on consistency and differentiation were not conclusive. There was significance between differentiation and job satisfaction but no significance was found between consistency and job satisfaction. It was also found that congruency, consistency and differentiation have an accumulative effect on job satisfaction. The findings suggest that the LCN can be used for measuring interests in the various nursing clinical areas and as an instrument in assisting nurses to choose the clinical area which will best fit their interests.

Discussion

Results from the previous studies indicate that there is mixed evidence concerning Holland's secondary constructs of congruency, consistency and differentiation as measures of educational achievement and educational or job satisfaction. Research producing positive findings as well as negative findings for the secondary constructs has been reported.

The majority of the studies in the second and third sections have supported Holland's hypothesis that individuals in high congruent environments are more satisfied than individuals in low congruent environments. Positive relationships between congruency and job satisfaction were found by Lorch (1976), Klein and Wiener (1977), Mount and Muchinsky (1978), Meir and Erez (1981) and Hener and Meir (1981). Additional support for Holland's congruency hypothesis and student satisfaction was provided by Walsh and Lewis (1972), Walsh (1974), Nafziger, Holland and Gottfredson (1975), Florence (1973) and Walsh, Spokane and Mitchell (1976). A small group of studies failed to provide clear support for Holland's congruency hypothesis for predicting student satisfaction (Morrow, 1971; Bates, Parker & McCoy, 1970; Gilbride, 1973).

One of the limiting factors of the congruency studies done in the early 1970's was the almost exclusive use of college students as the population being studied. Since most of the investigations were conducted by educational researchers interested in student development research, this is not surprising. Unfortunately, this situation makes it very difficult to generalize the results of the studies to other populations. In more recent studies (Mount & Muchinsky, 1978; Meir & Erez, 1981; Hener & Meir, 1981), this trend has changed and much more research is being conducted outside of the college milieu. The expansion to other population groups is a necessary development if the construct of congruency is going to be applied outside of the educational setting.

Most research which had tested the consistency hypothesis had provided only weak support for the theoretical construct. Frantz and Walsh (1972), Foster and Gade (1973) and O'Neil (1977) found no significant relationship between consistency and academic achievement with studies involving college students. Reuterfors, Schneider and Overton (1979) found a curvilinear relationship between consistency and achievement. They found no differences between high and low consistency groups, but both groups were significantly higher than the medium consistency groups.

On the positive side, Posthuma and Navran (1970) and Wiley and Magoon (1982) found that high consistency subjects earned higher grades in college than low consistency subjects. As well, Barak and Rabbi (1982), adopting a behavioral definition for consistency level, found that high consistency subjects have higher academic achievement in college than low consistency subjects.

Efforts to predict satisfaction with occupational choice from consistency using Holland's classification have failed (Nafziger et al., 1975; Bates et al., 1970; Lorch, 1976; Hener & Meir, 1981). Due to these inconclusive findings, Holland (1976), O'Neil, Magoon and Tracey (1978) and Holland, Magoon and Spokane (1981) have called for more examination and clarification of the construct of consistency.

The research has indicated that there is mixed evidence for Holland's hypothesis that individuals having high differentiated personality profiles experience greater academic success or experience occupational satisfaction than individuals having low differentiated profiles. Frantz and Walsh (1972) found that male graduate students with high differentiated profiles achieved higher grades than students with low differentiated personalities. Reuterfors, Schneider and Overton (1979) also found that male freshmen with high differentiated personal orientations achieved higher grade point averages than males having low differentiated personality profiles. For females, differentiation was not significant. O'Neil (1977), on the other hand, reported that high differentiated college freshmen did not differ in terms of grade point average over a four-year college period from low differentiated students.

Attempts to predict satisfaction with educational or occupational choice from differentiation using Holland's classification have not been that successful. Florence (1973) and Nafziger, Holland and Gottfredson (1975) found that there were no significant results between high differentiated and low differentiated students regarding student satisfaction.

Bates et al. (1970), Peiser and Meir (1978) and Hener and Meir (1981) found no clear significant relationship between differentiation and job satisfaction. Lorch (1976), however, found a significant relationship between differentiation and job satisfaction for female workers. No significant relationship was found for male workers.

Null Hypotheses

The present study was developed to test the following null hypotheses:

Criterion measure: Academic achievement scores

1. H_0: There is no difference on academic achievement as measured by English 10 between males and females or between two levels of consistency.
2. H_0: There is no difference on academic achievement as measured by English 10 between males and females or between two levels of differentiation.
3. H_0: There is no difference on academic achievement as measured by Biology 10 between males and females or between two levels of consistency.
4. H_0: There is no difference on academic achievement as measured by Biology 10 between males and females or between two levels of differentiation.
5. H_0: There is no difference on academic achievement as measured by Typing 10 between males and females or between two levels of consistency.

6. H_0: There is no difference on academic achievement as measured by Typing 10 between males and females or between two levels of differentiation.

Criterion measure: JDI satisfaction scores

7. H_0: There is no difference on current job satisfaction as measured by the JDI between males and females or among three levels of congruency measured.
8. H_0: There is no difference on current job satisfaction as measured by the JDI between males and females or between two levels of consistency measured five years earlier.
9. H_0: There is no difference on current job satisfaction as measured by the JDI between males and females or between two levels of differentiation measured five years earlier.
10. H_0: There is no difference on current job satisfaction as measured by the JDI among three levels of congruency, two levels of consistency and two levels of differentiation measured five years earlier.

Criterion measure: MSQ satisfaction scores

11. H_0: There is no difference on current job satisfaction as measured by the MSQ between males and females or among three levels of congruency.
12. H_0: There is no difference on current job satisfaction as measured by the MSQ between males and females or between two levels of consistency measured five years earlier.
13. H_0: There is no difference on current job satisfaction as

measured by the MSQ between males and females or between two levels of differentiation measured five years earlier.

14. H_0: There is no difference on current job satisfaction as measured by the MSQ among three levels of congruency, two levels of consistency and two levels of differentiation measured five years earlier.

Correlation between the JDI and MSQ

15. H_0: There is no relation between the JDI and MSQ for males and females.

CHAPTER III

DESIGN

Chapter Three begins with a description of the population sample which was used in the study. The four instruments used in the study are then described and discussed. The procedures of administering the SDS, selecting the sample, collecting the achievement results and administering the satisfaction questionnaire are presented in chronological order. The last section presents the statistical tests which were used in analyzing the hypotheses.

Population

The subjects used for this study were chosen from M. E. LaZerte Composite High School in northeast Edmonton, one of twelve high schools in the Edmonton Public School Board system. The school offers a full range of programs: general, business, vocational and academic matriculation. The school has a population of approximately 1,800 students including about 600 at the Grade 11 level. The socio-economic status of the students varies from the upper-middle to the lower classes.

The school is operated on a partially semestered year. The sample group was enrolled in one of the Grade 11 level Social Studies electives (these include sociology, geography, psychology and social studies) during the first semester. The Grade 11 Social Studies elective is demanded by Alberta Education as one of the requirements for a High School Diploma. Because of the compulsory nature of the Grade 11 Social

Studies elective, the subjects chosen should form a representative sample of the school population.

M. E. LaZerte offers the Grade 11 Social Studies electives in a semestered program. This means that half the Grade 11 class would register in the first semester and the remaining half in the second. This study involved all of the Grade 11 students (181 male, 169 female) who were registered in the first semester.

Instruments

Four instruments were used in this study: (1) the Self-Directed Search (SDS) assessed a person's personality type; (2) the Job Descriptive Index (JDI) measured job satisfaction; (3) the Minnesota Satisfaction Questionnaire Short-Form (MSQ) was also used to measure job satisfaction; and (4) final grade averages in the high school subjects, Biology 10, English 10 and Typing 10, assessed student achievement.

Self-Directed Search (SDS). The SDS (Holland, 1977) is a self-administering, self-scoring and self-interpreting instrument based on Holland's theory of careers (Holland, 1973). The SDS includes two booklets: the assessment booklet and the Occupations Finder (Holland, 1977). The Occupations Finder is Holland's occupational classification system and it contains occupational titles arranged by their respective Holland three-letter codes along with Canadian Classification and Dictionary of Occupations (CCDO) numbers and estimates of general educational development (GED) levels. The assessment booklet is organized in terms of six personality types: Realistic, Investigative, Artistic, Social, Enterprising and Conventional. Separate sections for Activities, Competencies, Occupations and Self-Ratings determine a person's resemblance to each type.

The SDS can also be used to assess the population of a college, a business, a community or of any other institution or group. The classification results in a six-variable profile.

The SDS scales have a moderate degree of internal consistency. Samples of 2,000 to 6,000 college freshmen show the KR-20's range from .67 to .94. The retest reliabilities of the SDS scales for samples of high school and college students range from .31 to .87. The retest reliability of the rank order of summary codes ranges from .83 to .92 (Holland, 1979).

The item content and format reflect clear content validity. Content is consistent with well-established vocational knowledge. The predictive validity of the SDS summary codes is comparable to and sometimes exceeds the predictive validities of similar interest inventories. A review of the predictive studies indicates that the SDS has hit rates for males of usually 35 to 45% in a six-category scheme. For females, the hit rate is in the range of 55 to 65% for the SDS (Holland, 1979).

Job Descriptive Index (JDI). The Work scale of the JDI (Smith, Kendall & Hulin, 1969) was used in this study. The JDI was developed by Smith et al. (1969) at Cornell University as a standardized instrument for the measurement of job satisfaction. The JDI measures satisfaction over five areas of a job: the work itself, the supervision, the co-workers, the pay and the opportunities for promotion on the job. For each area, the subject is asked to circle one of three alternatives: Yes, ?, or No to indicate whether the word describes his job. The Work scale has a scoring range of 1 to 54.

The theory behind the JDI is never clearly indicated by Smith et al. (1969). However, they do expand on some concepts which have implications for the development of a general model of satisfaction. Smith et al. (1969) state that job satisfaction is a function of the perceived characteristics of the job in relation to an individual's frame of reference. The frame of reference is an internal standard which is provided by the interrelationships of the individual's expectations, prior experiences, actual experiences on the job and alternatives open to him. The authors also expound a multi-dimensional notion of job satisfaction. The dimensions of the job that exert major feelings of job satisfaction are the nature of the work itself, the details of remuneration, the nature of promotional opportunities, the supervision and the attributes of co-workers on the job. Smith et al. (1969) believe that these five dimensions or scales should not be summed to obtain an overall measure of job satisfaction since the scales are theoretically not additive.

The estimated split-half internal consistencies for the five JDI scales, using a sample of 80 male employees from two electronic plants, varied from .80 to .88. The reliability coefficient for the Work scale was .84 (Smith et al., 1969). A test-retest reliability study was done with 45 employees of a farmers' cooperative over a three-year interval. Reliability coefficients ranged from .45 to .75. Smith et al. (1969) mention that the low results may be due to the fact that the cooperative underwent a major management change during the period of the study.

Four major studies described by Smith et al. (1969) were conducted to examine the validity of the JDI. In each study, validity was assessed by a modification of the Campbell-Fiske model for establishing convergent and discriminant validity (Campbell & Fiske, 1959) using cluster analysis of principal component analysis. The four studies revealed that the individual JDI scales are highly correlated with other measures of satisfaction such as the Job in General (JIG) scale (Kunin, 1955) or the Graphic scale (Smith et al., 1969). Using the multi-trait, multi-method approach to demonstrate convergent and discriminant validity for the five JDI scales, it was found that the five factors are highly discriminable and that there is very little method variance contributing to the correlations between factors. Factor analyses of the items which make up the JDI revealed that most of the 72 items load the way they should on the five factors. It seems clear from the evidence provided by these four studies that the JDI measures five different aspects of job satisfaction in the manner defined by the authors.

The JDI has been used by other researchers in a variety of different settings. Lorch (1976) studied a group of 171 employees from a marketing department of a large corporation and found the JDI to be an excellent instrument in discriminating satisfied workers from dissatisfied ones. He also found that the JDI, MSQ and the JIG were all highly correlated with each other. Smart and Morstain (1975) administered the JDI to a group of 508 college administrators. In their analysis, they formed three groups based on the degree of congruency between preferred and perceived job characteristics. They found that the JDI discriminated between the satisfaction levels of the congruent and discongruent groups. Gillet and Schwab (1975) examined the discriminant and convergent validities of the JDI and MSQ. Using the Campbell-Fiske model, they found statistically significant convergent and discriminant validities. Knoop and O'Reilly (1976) used the JDI in a study of teacher satisfaction in Ottawa and found that it did not tap many of the factors of critical importance to teachers. The researchers suggested that the JDI could be successfully employed for comparative studies.

The JDI is being widely used in satisfaction research. It was very carefully developed and documented, is relatively easy to use and understand, and relates logically and empirically to other measures of job satisfaction. A nice feature of the JDI is that all scales do not have to be used for a study since they are independent dimensions. Landy and Trumbo (1980) believe that if more researchers adopted the JDI for the measurement of satisfaction, differences in results and interpretation due to the nature of the measurement process will disappear and the construct of satisfaction will be better understood.

Minnesota Satisfaction Questionnaire Short-Form (MSQ). The MSQ short-form (Weiss, Dawis, England & Lofquist, 1967) was used in this study. This questionnaire consists of 20 items designed to measure job satisfaction. The MSQ short-form was developed by choosing 20 representative items from the 100-item MSQ long-form. The MSQ short-form can be scored on three scales: intrinsic satisfaction, extrinsic satisfaction and general satisfaction. Only the General Satisfaction scale was used in this study. The MSQ requires a person to make a Likert-type response by choosing one of five response alternatives for each item. The five alternatives vary from very satisfied to very dissatisfied. Each of the 20 items focuses upon the person's level of satisfaction with different aspects of his job.

The Theory of Work Adjustment prepared by Lofquist and Dawis (1969) provides the theoretical basis for the MSQ. Lofquist and Dawis define work adjustment as "the continuous and dynamic process by which the individual seeks to achieve and maintain correspondence with his environment" (1969, p. 46). This means that the individual possesses certain abilities (skills) and psychological needs (reinforcement values) which interact to form the structure of his personality. The environment has certain requirements for abilities and a reinforcer system. Job satisfaction is a function of the correspondence between the reinforcer system of the work environment and the individual's needs. The MSQ presents 20 categories that measure the extent to which a worker's needs are met and abilities utilized.

Data on the internal consistency reliability of the MSQ were estimated by Hoyt's analysis of variance method. A sample of 1,723 workers from seven different occupations was used to determine the Hoyt reliability coefficients. This sample consisted of 227 office clerks, 74 assemblers, 358 electrical assemblers, 387 engineers, 242 janitors, 240 machinists and 195 salesmen. The coefficients on the General Satisfaction scale varied from .87 for assemblers to .92 for engineers with a median reliability coefficient of .90. No data were available concerning test-retest reliability. However, stability for the General Satisfaction scale may be inferred from the data of the General Satisfaction scale of the MSQ long-form. Test-retest correlations of General Satisfaction scores had coefficients of .89 over a one-week period and .70 over a one-year period.

Evidence of validity is limited to a few studies from which construct validity is implied. Since the MSQ short-form is based on the long-form items, validity for the short-form may be in part inferred from validity of the long-form. The MSQ manual (Weiss et al., 1967) gives reasonably valid, well-normed indications of general satisfaction at work.

Validity of the short-form was conducted on the seven occupational samples reported in the reliability study. It was found that occupational group differences were found on the General Satisfaction scale. A large body of research over the last 20 years indicates that there are occupational differences in job satisfaction. The data from this study indicate that the MSQ short-form can differentiate among occupational groups.

Also using the same sample of 1,723 workers, support for the construct validity was found when two constructs (satisfaction and satisfactoriness) of the Theory of Work Adjustment (Weiss, Dawis, England & Lofquist, 1964) were found to be significantly independent as hypothesized. The correlation between General Satisfaction and General Satisfactoriness was .11.

High school courses. Final grade averages in the Grade 10 courses of English 10, Biology 10 and Typing 10 were used as the instruments to measure school achievement. A brief description of the three courses follows:

English 10. This is a five-credit course which attempts to correlate literature and language through integrating language techniques and communication skills with a study of the short-story, the novel, non-fiction and the full-length modern play.

Biology 10. This is a three-credit course which surveys the plant and animal worlds. Included in the course is an opportunity to dissect plants and animals. Time is also spent on classification and the anatomy of cells.

Typing 10. This is a five-credit course which is an introductory course in typing with special emphasis on proper techniques for mastering the keyboard as demanded by the touch system. Training is provided in centering, tabulation, business letter form and manuscript form.

Procedures

Administration of the Self-Directed Search (SDS). The SDS was administered to a group of 350 eleventh graders during the last two weeks of October, 1977. The subjects were enrolled in one of the Grade 11 level Social Studies electives (these included sociology, geography, psychology and social studies) during the first semester. The compulsory nature of the Social Studies electives should provide a representative sample of the school population.

Testing occurred during regularly scheduled classes which are 80 minutes in length. SDS booklets and Occupations Finders were distributed by counsellors who were part of the research project. All counsellors had interpreted the SDS before so that they were familiar with its content and administration. Since the SDS is a self-administered inventory, very few instructions were given.

The subjects were instructed that the SDS is a useful vocational and educational planning device which they may find useful in identifying potential occupational choices. They were also told that their results from the SDS were to be used for a career development study. It was mentioned that part of the career development study involved receiving a follow-up job satisfaction questionnaire. All participants were briefed that the results obtained from the study were confidential and that any student who did not wish to participate in the study would be exempted. Subjects were told that they could score the inventory themselves so that the results would be known to them immediately after the testing session which lasted 80 minutes.

Selection of the sample. Two standards had to be met for a subject to be eligible for the study. First, a complete and scoreable SDS had to be available for the subject. Second, no ties between first and second letters of the SDS summary code were allowed. A tie would have meant that the subject resembled two personality types equally, making it difficult to assign a personality type. Of the total sample, 319 subjects (167 males and 152 females) were eligible for the study.

Collection of achievement results. The final course marks in English 10, Biology 10 and Typing 10 were obtained from the students' cumulative record folders at the end of the semester in January of 1978.

Administration of the satisfaction questionnaire. In February, 1982, envelopes containing the Job Descriptive Index and the Minnesota Satisfaction Questionnaire were sent to each of the 319 subjects. Instructions regarding how to complete the satisfaction questionnaire were included. Subjects were also asked to provide a job title or description of their present employment. Two hundred subjects responded to the questionnaire. Data collection terminated at the end of April, 1982.

Statistical Treatment

Two-way analyses of variance were used to test the differences on academic achievement between males and females and on each of the constructs of consistency and differentiation. Two-way analyses of variance were also used to test the differences on current job satisfaction between males and females and on each of congruency, consistency and differentiation measured five years earlier. A Tukey (a) test (Winer, 1971) was used to examine differences between means for the levels of congruency if significance was found. Three-way analyses of variance were used to test the differences on current job satisfaction among levels of congruency, consistency and differentiation measured five years earlier. Significance of the F-ratios was interpreted by appropriate use of the F-table (Downie & Heath, 1965).

The level of confidence was set at 5% or .05 level. The degree of correlation between the two measures of job satisfaction was determined by Pearson product moment correlation.

CHAPTER IV

RESULTS

This study was conducted primarily to test hypotheses which were derived from Holland's theory of careers. The chapter begins with results of the two-way analyses of variance which were used to test the differences on academic achievement between males and females and on each of the constructs of consistency and differentiation. The second section presents the results of the two- and three-way analyses of variance which were used to test the differences on job satisfaction (as measured by the Job Descriptive Index) between males and females and Holland's three constructs. The third section provides the results of the two- and three-way analyses of variance which were used to test the differences on job satisfaction (as measured by the Minnesota Satisfaction Questionnaire) between males and females and Holland's three constructs. The final section presents the results of the Pearson product moment correlation of the JDI with the MSQ for males and females.

Academic Achievement with Consistency and Differentiation

The first section presents the results of the two-way analyses of variance which were used to test the following hypotheses:

1. H_0: There is no difference on academic achievement as measured by English 10 between males and females or between two levels of consistency.

2. H_0: There is no difference on academic achievement as measured by English 10 between males and females or between two levels of differentiation.
3. H_0: There is no difference on academic achievement as measured by Biology 10 between males and females or between two levels of consistency.
4. H_0: There is no difference on academic achievement as measured by Biology 10 between males and females or between two levels of differentiation.
5. H_0: There is no difference on academic achievement as measured by Typing 10 between males and females or between two levels of consistency.
6. H_0: There is no difference on academic achievement as measured by Typing 10 between males and females or between two levels of differentiation.

Table 2 shows the results of the analysis of variance and the means and standard deviations for Hypothesis 1. The interaction effect between sex by consistency was not significant which indicates that the classification variables were independent. The main effect for sex was significant at the .05 level. The main effect for consistency was not significant. The null hypothesis was accepted for the interaction effect and the main effect for consistency but rejected for the main effect for sex.

A very similar situation occurred in Table 3 where the interaction between sex by differentiation and the main effect for differentiation were not significant. The main effect for sex was significant.

Table 2

Two-Way ANOVA of English Scores with Factors Sex and Consistency

Source	Variance Table			
	df	SS	MS	F
Sexes	1	2378.89	2378.89	15.41*
Levels of consistency	1	116.63	116.63	.76
Sex x consistency	1	4.47	4.47	.03
Within	315	48636.67	154.40	

Note: *p < .05

Means and Standard Deviations of English Scores Broken Down by Sex and Consistency

Group	Mean	SD	N
Males			
On high level of consistency	60.31	12.57	91
On low level of consistency	58.87	11.90	76
Females			
On high level of consistency	65.55	12.73	74
On low level of consistency	64.59	12.47	78

Table 3

Two-Way ANOVA of English Scores with Factors Sex and Differentiation

Source	df	SS	MS	F
	Variance Table			
Sexes	1	2509.98	2509.98	15.43*
Levels of differentiation	1	441.89	441.89	2.90
Sex x differentiation	1	191.36	191.36	1.25
Within	315	48124.52	152.78	

Note: *p < .05

Means and Standard Deviations of English Scores Broken Down by Sex and Differentiation

Group	Mean	SD	N
Males			
On high level of differentiation	61.28	13.37	97
On low level of differentiation	57.40	10.18	70
Females			
On high level of differentiation	65.45	12.33	73
On low level of differentiation	64.70	12.84	79

Hypothesis 2 was accepted for interaction effect and the main effect for differentiation but rejected for the main effect for sex.

Table 4 provides the results of the analysis of variance for Hypothesis 3. The interaction effect and the main effect for consistency were not significant. The main effect for sex was significant at the .05 level. The null hypothesis was accepted for the interaction effect and the main effect for consistency. The main effect for sex was rejected.

The interaction effect on Table 5 was significant at the .05 level which indicates that the classification variables were not independent. For each sex, a two-tailed t-test was used to compare the means of the high differentiated and low differentiated subjects. High differentiated males obtained significantly higher scores on Biology than the low differentiated males. No difference was observed between high differentiated and low differentiated females.

As noted in Table 6, the interaction effect and the main effects for sex and consistency were not significant. Based on these results, Hypothesis 5 was accepted for the interaction effect and the main effects for sex and consistency.

The results in Table 7 indicate no significant interaction effect or main effects for sex and differentiation. Hypothesis 6 was accepted for the interaction effect and the main effects for sex and differentiation.

Table 4

Two-Way ANOVA of Biology Scores with Factors Sex and Consistency

Source	Variance Table			
	df	SS	MS	F
Sexes	1	875.25	875.25	4.20*
Levels of consistency	1	297.82	297.82	1.43
Sex x consistency	1	68.48	68.48	.33
Within	277	57688.32	208.26	

Note: $*p < .05$

Means and Standard Deviations of Biology Scores Broken Down by Sex and Consistency

Group	Mean	SD	N
Males			
On high level of consistency	65.29	12.06	87
On low level of consistency	62.28	14.94	64
Females			
On high level of consistency	67.88	13.06	60
On low level of consistency	66.87	14.28	70

Table 5

Two-Way ANOVA of Biology Scores with Factors
Sex and Differentiation

Source	Variance Table			
	df	SS	MS	F
Sexes	1	848.97	848.97	4.12*
Levels of differentiation	1	173.41	173.41	.84
Sex x differentiation	1	801.88	801.88	3.90*
Within	277	57079.32	206.06	

Note: *p < .05

Means and Standard Deviations of Biology Scores
Broken Down by Sex and Differentiation

Group	Mean	SD	N
Males			
On high level of differentiation	65.88	14.90	93
On low level of differentiation	61.02	14.80	58
Females			
On high level of differentiation	66.34	14.06	65
On low level of differentiation	68.34	13.33	65

Table 6

Two-Way ANOVA of Typing Scores with Factors
Sex and Consistency

Source	Variance Table			
	df	SS	MS	F
Sexes	1	442.21	442.21	1.82
Levels of consistency	1	.11	.11	.00
Sex x consistency	1	755.99	755.99	3.12
Within	181	44047.40	243.36	

Note: *p < .05

Means and Standard Deviations of Typing Scores
Broken Down by Sex and Consistency

Group	Mean	SD	N
Males			
On high level of consistency	63.33	14.28	30
On low level of consistency	57.72	16.05	32
Females			
On high level of consistency	61.94	17.58	50
On low level of consistency	64.95	14.43	73

Table 7

Two-Way ANOVA of Typing Scores with Factors Sex and Differentiation

Source	Variance Table			
	df	SS	MS	F
Sexes	1	401.42	401.42	1.62
Levels of differentiation	1	19.65	19.65	.08
Sex x differentiation	1	.11	.11	.00
Within	181	44783.75	247.42	

Note: *p < .05

Means and Standard Deviations of Typing Scores Broken Down by Sex and Differentiation

Group	Mean	SD	N
Males			
On high level of differentiation	60.18	15.69	40
On low level of differentiation	60.91	15.09	22
Females			
On high level of differentiation	63.39	14.88	57
On low level of differentiation	64.02	16.65	66

JDI with Congruency, Consistency and Differentiation

The second section presents the results of the two- and three-way analyses of variance which were used to test the following hypotheses:

7. H_0: There is no difference on current job satisfaction as measured by the JDI between males and females or among three levels of congruency.
8. H_0: There is no difference on current job satisfaction as measured by the JDI between males and females or between two levels of consistency measured five years earlier.
9. H_0: There is no difference on current job satisfaction as measured by the JDI between males and females or between two levels of differentiation measured five years earlier.
10. H_0: There is no difference on current job satisfaction as measured by the JDI among three levels of congruency, two levels of consistency and two levels of differentiation measured five years earlier.

Table 8 shows the results of the analysis of variance and the means and standard deviations for Hypothesis 7. The interaction effect between sex by congruency was not significant, which indicates that the classification variables were independent. The main effect for sex was not significant. The main effect for congruency was significant at the .05 level.

The Tukey (a) test (Winer, 1971) was used to examine differences between means for the three levels of congruency for each of the male and female groups. High and medium congruent males achieved higher ($p < .05$) JDI scores than the low congruent males and significant

Table 8

Two-Way ANOVA of JDI with Factors Sex and Congruency

Source	Variance Table			
	df	SS	MS	F
Sexes	1	7.44	7.44	.10
Levels of congruency	2	5460.80	2730.40	36.42*
Sex x congruency	2	23.78	11.89	.16
Within	194	14543.93	74.97	

Note: *p < .05

Means and Standard Deviations of JDI Broken Down by Sex and Congruency

Group	Mean	SD	N
Males			
On high level of congruency	40.00	5.27	37
On medium level of congruency	34.89	9.92	45
On low level of congruency	26.25	9.15	20
Females			
On high level of congruency	39.19	7.70	21
On medium level of congruency	35.22	8.47	46
On low level of congruency	24.97	10.35	31

difference was found between high and medium groups. High and medium congruent female groups achieved significantly higher JDI scores than the low congruent females but no significant difference was found between high and medium groups. The null hypothesis was accepted for the interaction effect and the main effect for sex but rejected for the main effect for congruency.

As noted in Table 9, the interaction effect and the main effects for sex and for consistency were not significant. Based on this information, Hypothesis 8 was accepted for the interaction effect and the main effects for sex and consistency.

Table 10 shows the results of the analysis of variance for Hypothesis 9. The interaction effect between sex by differentiation and the main effect for sex were not significant. The main effect for differentiation was significant at the .05 level. The null hypothesis was accepted for the interaction effect and the main effect for sex but rejected for the main effect for differentiation.

Table 11 summarizes the results of the three-way analysis of variance for congruency, consistency and differentiation on the JDI. Inspection of the analysis reveals that the three-way and two-way interactions were not significant. However, the congruency main effect was significant at the .05 level. Hypothesis 10 was accepted for all interaction effects and the main effects for consistency and differentiation, but rejected for the main effect for congruency.

Table 9

Two-Way ANOVA of JDI with Factors Sex and Consistency

Source	df	SS	MS	F
	Variance Table			
Sexes	1	239.44	239.44	2.37
Levels of consistency	1	.671	.671	.01
Sex x consistency	1	197.17	197.17	1.95
Within	196	19830.66	101.18	

Note: *p < .05

Means and Standard Deviations of JDI Broken Down by Sex and Consistency

Group	Mean	SD	N
Males			
On high level of consistency	35.93	8.36	59
On low level of consistency	33.84	11.14	43
Females			
On high level of consistency	31.77	10.10	44
On low level of consistency	33.69	10.80	54

Table 10

Two-Way ANOVA of JDI with Factors Sex and Differentiation

Source	Variance Table			
	df	SS	MS	F
Sexes	1	271.79	271.79	2.79
Levels of differentiation	1	633.35	633.35	6.50*
Sex x differentiation	1	294.70	294.70	3.02
Within	196	19100.46	97.45	

Note: *p < .05

Means and Standard Deviations of JDI Broken Down by Sex and Differentiation

Group	Mean	SD	N
Males			
On high level of differentiation	37.96	6.38	52
On low level of differentiation	32.02	11.43	50
Females			
On high level of differentiation	33.32	10.21	53
On low level of differentiation	32.24	10.88	45

Table 11

Three-Way ANOVA of JDI with Factors Congruency, Consistency and Differentiation

Source	Variance Tables			
	df	SS	MS	F
Congruency (A)	2	5205.06	2602.53	35.35*
Consistency (B)	1	.03	.03	.00
Differentiation (C)	1	111.91	111.91	1.52
A x B	2	132.41	66.21	.90
A x C	2	201.66	100.83	1.37
B x C	1	2.27	2.27	.03
A x B x C	2	227.50	113.75	1.55
Within	188	13840.79	73.62	

Note: $*p < .05$

MSQ with Congruency, Consistency and Differentiation

The third section presents the results of the two- and three-way analyses of variance which were used to test the following hypotheses:

11. H_0: There is no difference on current job satisfaction as measured by the MSQ between males and females or among three levels of congruency.
12. H_0: There is no difference on current job satisfaction as measured by the MSQ between males and females or between two levels of consistency measured five years earlier.
13. H_0: There is no difference on current job satisfaction as measured by the MSQ between males and females or between two levels of differentiation measured five years earlier.
14. H_0: There is no difference on current job satisfaction as measured by the MSQ among three levels of congruency, two levels of consistency and two levels of differentiation measured five years earlier.

A two-way analysis of variance was computed to test Hypothesis 11. The results of the analysis of variance and the means and standard deviations are presented in Table 12. The interaction effect between sex by congruency and the main effect for sex were not significant. The main effect for congruency was significant at the .05 level.

The Tukey (a) test was used to examine differences between means for the three levels of congruency for each of the male and female groups. High and medium congruent males achieved higher MSQ scores than the low congruent males; also, significant difference was found

Table 12

Two-Way ANOVA of MSQ with Factors
Sex and Congruency

Source	Variance Table			
	df	SS	MS	F
Sexes	1	247.95	247.95	2.43
Levels of congruency	2	9378.86	4689.44	45.89*
Sex x congruency	2	534.61	267.31	2.62
Within	194	19824.01	102.19	

Note: *p < .05

Means and Standard Deviations of MSQ
Broken Down by Sex and Congruency

Group	Mean	SD	N
Males			
On high level of congruency	85.32	6.65	37
On medium level of congruency	74.64	11.43	45
On low level of congruency	66.40	10.33	20
Females			
On high level of congruency	83.67	11.18	21
On medium level of congruency	80.37	9.17	46
On low level of congruency	66.52	11.80	31

between high and medium groups. High and medium congruent females achieved significantly higher MSQ scores than did the low congruent groups but no significant difference was found between high and medium females. The null hypothesis was accepted for the interaction effect and the main effect for sex but rejected for the main effect for congruency.

Based on the results of Table 13, Hypothesis 12 failed to be rejected. The interaction effect and the main effects for sex and consistency were not significant.

As noted in Table 14, the interaction effect between sex by differentiation and the main effect for sex were not significant. The main effect for differentiation was significant at the .05 level. Based in this information, Hypothesis 13 was accepted for the interaction effect and the main effect for sex, but rejected for the main effect for differentiation.

Table 15 summarizes the results of the three-way analysis of variance for Holland's three constructs on the MSQ. In the case of the MSQ, only the congruency main effect was significant at the .05 level. No other main effects or interactions were significant. Hypothesis 14 was accepted for all interaction effects and the main effects for consistency and differentiation but rejected for the main effect for congruency.

Correlation between the JDI and the MSQ

The final section presents the results of the Pearson product moment correlation which was used to test the following hypothesis:

Table 13

Two-Way ANOVA of MSQ with Factors Sex and Consistency

	Variance Table			
Source	df	SS	MS	F
Sexes	1	.01	.01	.00
Levels of consistency	1	112.25	112.25	.75
Sex x consistency	1	230.38	230.38	1.54
Within	196	29394.87	149.97	

Note: *p < .05

Means and Standard Deviations of MSQ Broken Down by Sex and Consistency

Group	Mean	SD	N
Males			
On high level of consistency	78.44	10.50	59
On low level of consistency	74.79	13.53	43
Females			
On high level of consistency	76.32	12.25	44
On low level of consistency	77.00	12.93	54

Table 14

Two-Way ANOVA of MSQ with Factors Sex and Differentiation

Source	Variance Table			
	df	SS	MS	F
Sexes	1	6.37	6.37	.04
Levels of differentiation	1	1149.48	1149.48	7.98*
Sex x differentiation	1	346.35	346.35	2.40
Within	196	28241.66	144.09	

Note: *p < .05

Means and Standard Deviations of MSQ Broken Down by Sex and Differentiation

Group	Mean	SD	N
Males			
On high level of differentiation	80.52	9.56	52
On low level of differentiation	73.14	13.07	50
Females			
On high level of differentiation	77.66	12.70	53
On low level of differentiation	75.52	12.45	45

Table 15

Three-Way ANOVA of MSQ with Factors Congruency, Consistency and Differentiation

Source	Variance Table			
	df	SS	MS	F
Congruency (A)	2	8226.70	4113.35	39.51*
Consistency (B)	1	27.79	27.79	.27
Differentiation (C)	1	246.02	246.02	2.36
A x B	2	289.28	144.64	1.39
A x C	2	77.99	38.99	.38
B x C	1	171.31	171.31	1.65
A x B x C	2	130.15	65.07	.63
Within	188	19574.40	1041.12	

Note: $*p < .05$

15. H_0: There is no relation between the JDI and MSQ for males and females.

Pearson correlation coefficients were calculated to determine the intercorrelations between the JDI and MSQ for males, females and the total group of subjects. Significant correlations at the .05 level were found between the JDI and the MSQ for males .75 and females .73 and the combined group .74. From this evidence, Hypothesis 15 was rejected.

CHAPTER V

SUMMARY AND DISCUSSION

Summary

The purpose of this study was to examine the ability of Holland's secondary constructs to predict academic achievement and job satisfaction for high school students. To accomplish these two goals, the study was completed over a five-year period.

Groups of 165 male and 154 female Grade 11 students were administered the SDS in 1977 and were categorized in terms of congruency, consistency and differentiation. Their academic achievement was assessed by final grade averages in the three Grade 10 subjects: English 10, Biology 10 and Typing 10. This group of 319 students formed the sample of the first part of the study which dealt with academic achievement. Five years later in 1982, two job satisfaction questionnaires which were the Job Descriptive Index (JDI) and the Minnesota Satisfaction Questionnaire (MSQ) were mailed to the original group of students. From the original group, 102 males and 98 females replied. This group of 200 subjects comprised the sample of the second part of the study which dealt with job satisfaction.

The first part of the study tested Holland's predicted relationships between academic performance and each of consistency and differentiation for high school students. Null hypotheses were posed about the relationship between: (1) consistency and academic achievement and (2) differentiation and academic achievement. Two-way analyses of variance were used to test the hypotheses concerning the relationship between the two constructs and the dependent achievement variables, English 10, Biology 10 and Typing 10.

The results of the analyses failed to find a relationship between consistency and achievement. No significant mean differences were found between high and low consistent subjects (male or female) for either English 10, Biology 10 or Typing 10 scores. The results of the analyses also failed to find a relationship between differentiation and achievement with one exception. No significant mean differences were found between high and low differentiated subjects (male or female) for either English 10 or Typing 10. The one exception occurred in Biology 10 where it was found that high differentiated males had significantly higher scores than low differentiated males. No significant difference was found for females on Biology 10 scores.

It was also found that females had significantly higher achievement scores than males in English 10 and Biology 10. No significant difference was found for Typing 10 scores between males and females.

The second part of the study tested Holland's predicted relationship between job satisfaction and congruency, consistency and differentiation for employed persons. A unique aspect of this study was the fact that five years elapsed between the original categorization of the students using Holland's constructs in 1977 and the completion of their job satisfaction questionnaires in 1982.

Holland hypothesized that employed persons who demonstrate high levels of the three constructs, singularly and in combination, will express greater job satisfaction than workers who exhibit low levels of the constructs. Null hypotheses were presented about the relationship between (1) current job satisfaction and congruency measured five years earlier, (2) current job satisfaction and consistency measured five years earlier, (3) current job satisfaction and differentiation measured five years earlier and (4) current job satisfaction and combinations of congruency, consistency and differentiation measured five years earlier.

Two-way analyses of variance were used to test the differences on current job satisfaction between males and females and on each of the constructs of congruency, consistency and differentiation measured five years earlier. A Tukey (a) test was used to examine differences between means for the levels of congruency if significance was found. The interactions of the constructs were analyzed by a three-way analysis of variance for the total group of two hundred subjects. Pearson correlation coefficients were calculated for the intercorrelations between the satisfaction measures (JDI and MSQ).

Holland's theory implies that congruency is positively related to job satisfaction. The study demonstrated that employees categorized as highly congruent expressed greater amounts of job satisfaction than those workers categorized as being low in congruency. These results were equally supportive for the combined total group and for each of the male and female groups across both measures of satisfaction.

The results indicated that no support was found for Holland's theoretical position that consistency is a meaningful predictor of job satisfaction. A worker categorized as high in consistency did not indicate any greater amount of job satisfaction than a worker categorized as low in consistency. These results held true for the total group, males and females, across both measures of job satisfaction.

The study provided some support for Holland's differentiation hypothesis. The results indicated that workers categorized as high differentiated expressed greater amounts of job satisfaction than those workers categorized as being low differentiated. These results held for the total group, males and females, across both measures of job satisfaction.

The results provided no support for Holland's hypothesis that a high congruent, high consistent and high differentiated worker expressed greater satisfaction than a low congruent, low consistent and low differentiated worker. The three-way analyses of variance for the total group indicated that there were no three-way or two-way interactions for the constructs of congruency, consistency and differentiation. The three constructs did not combine meaningfully to account for job satisfaction as measured by the JDI or the MSQ.

Discussion

The first part of the study investigated predictions derived from Holland's theory of careers concerning the academic performance of Grade 11 students. The results did not support the construct of consistency and its relationship to academic achievement for either sex. This finding is in agreement with the findings of Reuterfors, Schneider and Overton (1979), Foster and Gade (1973) and O'Neill (1977) who found no significant relationship between consistency and academic achievement in studies involving college students. The findings did not agree with Posthuma and Navran (1970) and Wiley and Magoon (1982) who found that high consistency subjects earned higher grades in college than low consistency subjects.

It was also determined that there was no relationship between differentiation and academic achievement with the exception of the situation which occurred with Biology 10 where it was found that high differentiated males had significantly higher scores than did the low differentiated males. The positive results for males supported the findings of Frantz and Walsh (1972) and Reuterfors, Schneider and Overton (1979) who found that male college students with high differentiated profiles achieved higher grade point averages than males having low differentiated profiles. With the exception of the dependent variable, Biology 10, the findings for differentiation did not support Holland's theory. The negative findings are in agreement with O'Neill (1977) who reported no difference in grades between high and low differentiated college students.

The results indicated that females had significantly higher achievement scores than males in English 10 and Biology 10. This general superiority in females' achievement is consistent with the literature (Anastasi, 1968; Caldwell & Harnett, 1967; Hewitt & Goldman, 1975; Reuterfors, Schneider & Overton, 1979).

This study has found little or no support for the idea that consistency or differentiation are related to academic achievement. The results of the present study along with the conflicting results of other studies lead one to believe that counsellors should be very cautious when using the constructs of consistency and differentiation as diagnostic tools in predicting achievement for high school students. To be more emphatic, until further studies are replicated with samples from other high schools using different measures of achievement, it is not recommended that the constructs of consistency and differentiation be used to predict academic achievement for high school students.

The second part of the study was unique in that five years elapsed between the original categorization of students using Holland constructs and the completion of the job satisfaction questionnaires in 1982. The literature to this date reveals no longitudinal studies concerning the relationship between Holland's secondary constructs and job satisfaction for high school students.

The results obtained in this study show strong support for the predictive validity of the SDS and the construct validity of Holland's concept of congruency. These results were equally supportive for males and females and are in agreement with those obtained by Lorch (1976), Klein and Wiener (1977), Mount and Muchinsky (1978), Meir and Erez (1981) and Hener and Meir (1981). The finding that an employee's job satisfaction is influenced by the relationship of the interest type measured five years earlier to the type of environment in which he presently works has tremendous implications for assisting both occupational placement and selection. In the area of placement, it would be possible for the high school counsellor to assist students in choosing occupations which might prove satisfying to them. Similarly, in the area of selection, it would be possible for prospective employers to choose employees whose interest types are congruent with specific work environments.

The results show support for the construct of differentiation and its relationship to future job satisfaction. They were equally supportive for both sexes and indicate that the more a person resembles one personality type, the greater his chances of experiencing job satisfaction. The findings of this study are contrary to those of Bates et al. (1970), Peiser and Meir (1978) and Hener and Meir (1981) who found no clear significant relationship between differentiation and job satisfaction. Lorch (1976), however, using the JDI and the MSQ, found a significant relationship between differentiation and job satisfaction for female workers but not for male workers.

The research indicates that there is mixed support for the theoretical position that differentiation is related to job satisfaction. Due to the conflicting results between the findings of the present study and other research findings, it is recommended that additional research be done on the construct of differentiation before it can be used with a high degree of confidence in predicting job satisfaction. This does not mean that differentiation should be dismissed as a diagnostic tool, but discretion is recommended.

The results of the present study provided no support for Holland's consistency hypothesis and future job satisfaction. The results are in agreement with those reported by Nafziger et al. (1975), Bates et al. (1970), Lorch (1976) and Hener and Meir (1981). The common denominator in all these studies, including the present one, is the operational definition of consistency level, i.e., the individual's personality profile as measured by various inventories (VPI, SDS or SCII). It may be that it is not Holland's theory that has been rejected but the use of subjects' SDS, SCII or VPI codes to define consistency level. Barak and Rabbi (1982) believe that a behavioral definition for consistency level, i.e., the consistency of a subject's actual occupational choice, rather than a subject's response to an interest inventory, be used. The rationale for their position is based on the assumption that the subject's response to an interest inventory requires less commitment than an actual job choice.

Due to the lack of supporting evidence for the construct of consistency as defined in this study, it is not recommended that it be used as a diagnostic tool until further research has been done.

In concluding this section, the results of the second part of the study provide positive support for the idea that when considered independently, the constructs of congruency and differentiation as measured by the SDS are meaningful predictors of job satisfaction over a five-year period. The constructs of congruency and differentiation can be used with some degree of confidence by high school counsellors in predicting job satisfaction for Grade 11 students.

A degree of caution is directed toward counsellors who intend to use the SDS as a career development tool with this group of students. Most Grade 11 students are in the first part of the "exploration stage" of career development (Super, 1969). This stage is the period of time during which the student is exploring his needs, interests, capacities, values, and career opportunities. It is of utmost importance that the student be exposed to a variety of occupations rather than be limited to one or two. With this in mind, it is recommended that the SDS be used as a diagnostic tool within a developmental approach to career development. The SDS should not be used within a rigid trait-and-factor approach whereby the student would be told that this job or this profile is the one that is going to provide the most job satisfaction.

The predictive validity of the SDS and the construct validity of Holland's concept of congruency and differentiation make the SDS a valuable diagnostic tool when used as part of a total career development program for Grade 11 students.

Limitations of the Study

The original sample for this study was composed of students 15 to 17 years of age who all attended Grade 11 at the same composite high school in Edmonton. Even though the sample should be reasonably representative of Grade 11 students in Edmonton, the location of the school in a specific geographical area of the city along with its unique blend of ethnic and socio-economic groups may result in some bias. Thus, generalizations from this study to other groups of students may be limited.

The size of the sample restricted the type of statistics that could be used. The three-way analyses of variance were not used separately for males and females since some cells consisted of only a few scores. The three-way analyses were conducted only for the total group. The size of the sample also restricted the number of variables that could be used in the analyses. Some combinations of different levels of congruency by sex were small. A larger sample would have enabled the use of a multivariable analysis approach.

While all personality types were represented in the sample, some types were more representative than others. The Realistic and Social types were most representative while the Artistic and Enterprising were least representative. Due to the predominance of the Realistic and Social types, the findings may not be similarly meaningful for the other types.

The final limitation of the study was the use of final grades from the subjects English 10, Biology 10 and Typing 10 to assess academic achievement. Fluctuations with respect to the meaning of the subject grades depended on each individual teacher's evaluation scheme. Since six different teachers were involved in the teaching of English 10, one could reasonably except some discrepancy in marks. As well, subject scores were derived from tests that were not standardized.

Recommendations for Future Research

1. A development in the area of satisfaction measurement has been the reluctance of researchers to adopt common measuring instruments for job satisfaction. There has been a tendency to develop a new satisfaction questionnaire for each study. Unfortunately, the use of all these different measurements has led to confusion in the literature concerning job satisfaction.

It is recommended that future research in satisfaction adopt the JDI or the MSQ as two useful measures of job satisfaction. They have been carefully developed and documented and are relatively easy to use. In this study, the JDI and the MSQ did not measure precisely the same thing but they were moderately correlated. Either instrument or both could be used as a suitable measure of job satisfaction.

The adoption of one or both of these instruments would allow for differences in results and interpretations due to the nature of the measurement process to disappear. Hopefully, this would lead to a better understanding of the satisfaction construct.

2. Research needs to continue to test the validity and usefulness of the hexagonal model as the basis for defining levels of congruency and consistency.

3. It is questionable how accurate the environmental codes are for each of the 456 occupations listed in the Occupations Finder. There is a need for research which empirically validates the environmental code associated with specific occupations. It is extremely important when investigating the construct of congruency to categorize the interest and environmental typology accurately.

4. More research should be conducted using the Zener-Schnuelle index (Zener & Schnuelle, 1976) when evaluating the degree of agreement between subjects' SDS codes and occupational choices. Unfortunately, a good deal of research has simply defined congruency on a two-level, all-or-none definition.

5. Alternate ways of measuring differentiation should be utilized. The absolute difference between high and low scores does not take advantage of the information which deals with the shape of a person's personality profile.

6. The research dealing with the relationship between Holland's constructs and academic achievement should be replicated using standardized achievement tests.

7. This study should be replicated with samples equally representative of all six of Holland's personality types.

8. Research is needed to examine the possibility of applying

Holland's typology to school subjects. School subjects, like occupations, could be assigned Holland codes. A student would be able to compare the degrees of congruency between his personality and various school subject choices and plan a high school program that should result in success and satisfaction.

9. An alternative definition for consistency based on the hexagonal model should be explored. A behavioral definition for consistency rather than a subject's response to the SDS or the SCII is one alternative.

10. This study should be replicated with samples of students from other provinces to determine if the findings can be generalized.

11. The relative effectiveness of various counselling techniques intended to facilitate congruent educational and occupational decision-making needs to be established.

12. Research is needed to examine the developmental nature of Holland's constructs and types. Studies pertaining to changes in congruency, consistency and differentiation over time would be valuable, as would examination of factors affecting the development of the different Holland types.

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APPENDICES

APPENDIX A

LETTER SENT TO SUBJECTS OF STUDY

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY
FACULTY OF EDUCATION
THE UNIVERSITY OF ALBERTA

February 15, 1982

Dear M. E. LaZerte Graduate:

In 1977 you participated with 350 other students in a career development workshop at M. E. LaZerte. At that time, I was a guidance counsellor at the school. The workshop consisted of an interest inventory and an exploration of different occupations.

Presently I am completing my Ph. D. program at the University of Alberta under the supervision of Dr. George Fitzsimmons. My work will involve a follow-up of the 350 students who participated in the workshop.

It is regarding this follow-up that I am contacting you. I am interested in knowing your present occupation and your degree of satisfaction with it. The information that you provide will be used to improve current methods of helping high school students select occupations.

To assist in this study, I would greatly appreciate your completion of the brief one-page questionnaire which I have enclosed. This should take about 10 minutes. Please return the completed questionnaire in the self-addressed stamped envelope. The information you provide will be handled with complete confidentiality.

At the conclusion of this study, a review of the results will be available for interested participants. If you want immediate feedback on your results as well as your 1977 interest profiles, please call me at 436-6984.

Thank you in advance for your cooperation.

Sincerely,

Don Melnychuk

DM/hd

Don Melnychuk

P.S.

The success of my study depends on the information you provide, so please complete and return the survey as soon as possible.

6-102 EDUCATION NORTH, EDMONTON, ALBERTA, CANADA • T6G 2G5 • TELEPHONE (403) 432-5245

APPENDIX B

THE SELF-DIRECTED SEARCH

Material on pages 102 to 112 inclusive has been deleted due to copyright considerations.

The Self-Directed Search can be obtained from:

Guidance Centre
Faculty of Education
University of Toronto
Toronto, Ontario
M4W 2K8

APPENDIX C

THE MINNESOTA SATISFACTION QUESTIONNAIRE
SHORT-FORM

Material on pages 114 to 116 inclusive has been deleted due to copyright considerations.

The Minnesota Satisfaction Questionnaire Short-Form can be obtained from:

Vocational Psychology Research
University of Minnesota
Minneapolis, Minnesota
55455

APPENDIX D

THE JOB DESCRIPTIVE INDEX—WORK SCALE

WORK ON PRESENT JOB

Think of your present work. What is it like most of the time?

In the blank beside each word given below write

__Y__ for "Yes" if it describes your work

__N__ for "No" if it does NOT describe it

__?__ if you cannot decide

________ Fascinating

________ Routine

________ Satisfying

________ Boring

________ Good

________ Creative

________ Respected

________ Hot

________ Pleasant

________ Useful

________ Tiresome

________ Healthful

________ Challenging

________ On your feet

________ Frustrating

________ Simple

________ Endless

________ Gives sense of accomplishment